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AT BE CH DE DK ES FR GB GR IT LI LU NL SE(71) Applicant: **VANDERLANDE INDUSTRIES
NEDERLAND B.V.**
Vanderlandelaan 2
NL-5466 RB Veghel(NL)(72) Inventor: **van den Goor, Jacobus Marla**
Boxhornpad 6
NL-5641 WG Eindhoven(NL)
Inventor: **Bodewes, Hermannus Josephus**
Arnoldes
Hurk 207
NL-5403 LC Uden(NL)(74) Representative: **Noz, Franciscus Xaverius, Ir.**
et al
Algemeen Octrooibureau P.O. Box 645
NL-5600 AP Eindhoven(NL)(54) **Method of handling objects, in particular luggage.**

(57) The invention relates to a method of handling objects, in particular luggage, by means of an installation provided with an endless conveyor having carriers, whereby a supply conveyor for the supply of the objects to the endless conveyor connects to one side of said endless conveyor, and a discharge conveyor for the discharge of the objects likewise connects to one side of said endless conveyor. Prior to being supplied to the endless conveyor the objects to be handled in the installation are received in holders, which are secured to the carriers. The holders and the carriers are tilted about pivot pins extending at least substantially in the longitudinal direction of the endless conveyor so as to remove the objects from the holders at the location of a discharge conveyor. The empty holders of the carriers are delivered to a further discharge conveyor.

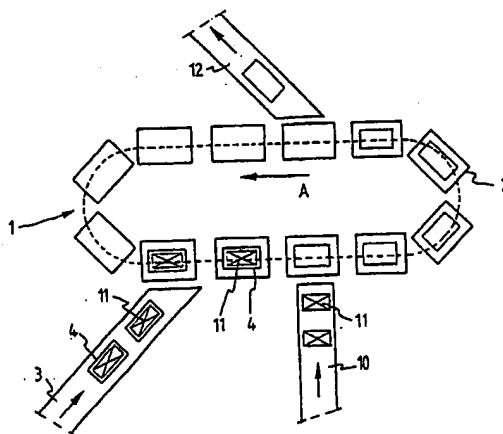


Fig 1

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The invention relates to a method of handling objects, in particular luggage, by means of an installation provided with an endless conveyor, whereby a supply conveyor for the supply of the objects to the endless conveyor connects to one side of said endless conveyor, whilst a discharge conveyor for the discharge of the objects likewise connects to one side of said endless conveyor, said endless conveyor being provided with carriers, which are tiltable about pivot pins extending at least substantially in the longitudinal direction of the endless conveyor, said carriers functioning to discharge an object carried by a carrier on a discharge conveyor.

Such a method can be derived from French Patent No. 2,182,148. With this known method the objects are placed loose on the carriers and conveyed to a selected discharge conveyor by means of an endless conveyor, at which location said object is discharged on the selected discharge conveyor by tilting of the carrier in question.

When handling uneven objects, e.g. when luggage is being handled, difficulties arise when such a method is being used, in particular because it is attempted to achieve ever higher handling speeds.

In practice it has become apparent that at least the larger part of luggage presented by air passengers shows features such as summarized in the table below.

| FEATURES OF LUGGAGE | | | | |
|---------------------|-------------|---------|---------|---------|
| | | Maximum | Average | Minimum |
| 20 | Weight (kg) | 40 | 15 | 1,5 |
| | Length (mm) | 1000 | 650 | 200 |
| | Width (mm) | 750 | 400 | 75 |
| 25 | Height (mm) | 750 | 250 | 25 |

Usually before being handled each piece of luggage is provided with a label or the like, which mentions data which are used as a guideline with the further internal transport of the piece of luggage in question. It will be apparent that as a result of the strong variations in the shapes of the pieces of luggage it is not possible to ensure a certain fixed position of the label in question, which makes it very difficult, if not altogether impossible, to read the label by means of e.g. optical equipment or the like.

The purpose of the invention is to obtain a method wherein the drawbacks of the known invention can be avoided.

According to the invention this can be achieved in that prior to being supplied to the endless conveyor the objects to be handled in the installation are received in holders, that said holders are secured to the carriers, that the holders and the carriers are tilted so as to remove the objects from the holders at the location of a discharge conveyor, and that the empty holders of the carriers are delivered to a further discharge conveyor.

When using the method according to the invention the objects, such as pieces of luggage, can be conveyed in holders having standard dimensions. The transport of such holders having standard dimensions can take place substantially more easily than the transport of randomly shaped objects, whilst at the same time these holders may be provided, at certain fixed places, with identifications relating to their destination, which may finally result in an efficient and fast handling of the holders and thus of the objects present in said holders.

The invention will be explained in more detail hereafter, with reference to the accompanying Figures.

Figure 1 is a diagrammatic plan view of a possible embodiment of a part of the installation according to the invention.

Figure 2 is a diagrammatic, larger-scale view of a part of the installation shown in Figure 1.

Figure 3 is a perspective, diagrammatic view of an embodiment of a holder.

Figure 4 shows the tilting of a holder.

Figure 5 diagrammatically illustrates a possibility of introducing objects into the holders.

Figure 6 diagrammatically illustrates the movement of a holder by means of a sloping conveyor belt.

The installation shown in Figure 1 comprises an endless conveyor 1, said conveyor comprising a plurality of coupled dishes or carriers 2, which are pivotable, with the aid of means not shown, in required places about pivot pins extending in the longitudinal direction of the conveyor. The construction of such an endless conveyor provided with pivotable dishes may be of the type such as disclosed in the above-mentioned French Patent Specification No. 2,182,148. During operation said endless conveyor 1 can be

driven with the aid of drive means (not shown), in such a manner that the dishes or carriers 2 will move in the direction indicated by the arrow A.

A supply conveyor 3 connects to one side of the endless conveyor 1, by means of which supply conveyor holders or boxes 4 can be supplied to the conveyor 1. The conveyor 3 may e.g. be an endless belt conveyor. Each of the boxes supplied by means of a conveyor 3 can be placed on a separate carrier or dish 2.

As is diagrammatically illustrated in Figure 2 the dimensions of each dish 2 are thereby adapted to the dimensions of the holder or box 4. At the side remote from the supply conveyor 3 the dish is provided with an upright side wall 5, whilst at its rear edge the dish is provided with a rear wall 6 joining up with the side wall 5. A flap 8 is connected, by means of an upwardly extending pivot pin 7, to the free front edge of the upright side wall 5, which flap may be pivoted, with the aid of operating means (not shown), between a position in which the flap 8 is in line with the side wall and a position in which the flap 8 extends parallel to the rear wall 6.

A flap 9 is coupled, by means of an upwardly extending pivot pin, to the free end of the rear wall 6 that is directed towards the supply conveyor 3, said flap being pivotable through 180° with the aid of drive means (not shown), between a position in which said flap extends from the rear wall 6 towards the rear, when seen in the direction of movement indicated by the arrow A, and a position in which said flap extends towards the front with respect to the rear wall, parallel to the side wall 5.

Upon being placed on the carrier 2 a holder or box 4 supplied in the direction according to the arrow B with the aid of the supply conveyor 3 will already be slightly pivoted in clockwise direction, when seen in Figure 2, as a result of the simultaneous movement of the carrier 2 in the direction according to the arrow A. After the holder 4 has been placed on the carrier 2 it will be pushed into its correct position with respect to the carrier 2 by pivoting of the flaps 8 and 9, and simultaneously be clamped down on the carrier 2.

At a desired discharge conveyor 10 connecting to one side of the endless conveyor 1 an object 11 present in the holder, e.g. a suitcase, a kit bag or similar piece of luggage may be deposited from the holder 4 on the discharge conveyor 10, by tilting of the carrier 2 with the holder 4 attached thereto, about the pivot pin extending in the longitudinal direction of the endless conveyor. The discharge conveyor 10 may e.g. be an endless conveyor belt, a roller conveyor, a chute or the like.

The empty holders or boxes 4 are moved towards a further discharge conveyor 12 by means of the conveyor 1, upon which, after pivoting of the flaps 8 and 9 into their open positions and possibly again tilting of the carriers 2, the empty holders 4 can be delivered so as to be resupplied to a point where objects to be conveyed can be introduced into the holders or boxes 4.

Although only one supply conveyor 3 for supplying holders loaded with objects, one discharge conveyor for discharging said objects, such as luggage, and one discharge conveyor for discharging empty holders or boxes 4 are shown in Figure 1, it will be apparent that also several supply conveyors and/or discharge conveyors for the objects, such as luggage and/or several discharge conveyors for the empty holders may be connected on the endless conveyor 1.

Figure 3 diagrammatically shows a preferred embodiment of a holder or box 4. As will be apparent from Figure 3 the box 4 is built up of four upright walls 13 - 16 including a rectangle. The bottom of the box is formed by a bottom plate 17 located between the side walls 13 and 15, which slopes downwards from the upper edge of the side wall 16 in the direction of the opposite wall 14. In the horizontal position of the holder 4 illustrated in Figure 4 said bottom plate 17 thereby includes an angle of $\pm 30^\circ$ with the horizontal. A plate 18 is provided between the bottom end of the bottom plate and the upper edge of the side wall 14, said plate extending at least substantially perpendicularly to the plate 17.

It stands to reason that the box according to Figures 3 and 4 is placed on a dish 2 in such a manner that the side walls 14 and 16 extend parallel to the longitudinal direction of the conveyor 1.

As will be apparent in particular from Figure 4 a piece of luggage 11 introduced in such a holder or box will always tend to slide towards the deepest point of the box, so as to abut against the upright wall 18. Thus a good location of the piece of luggage is achieved at all times, whilst upon tilting of the box, as is likewise indicated in Figure 4, the object 11 in question can easily slide out of the box without any risk of the object becoming jammed, not even if the object in question e.g. is a weak and/or soft piece of luggage.

By providing aligned holes 19 in the confronting walls 13 and 15, near the connection point between the walls 17 and 18, it can e.g. be ascertained, with the aid of optical means or the like, whether or not an object is present in the holder or box 4 in question.

As is furthermore shown in Figure 5 the holders may be moved, at a loading station for the holders, in the -direction according to the arrow C with the aid of a conveying means, whilst the objects 11 may be supplied in the direction according to the arrow D with the aid of a further conveying means located in a higher position, such as a conveyor belt 20 or the like. The conveying means 20 may thereby be positioned

at an angle corresponding with the angle of inclination of the wall part 17, as a result of which an even transfer of the objects 11 in the holders will be achieved.

As is furthermore shown in Figure 6 the holders 4 filled with the objects 11 may also be moved by means of conveyors 21 extending at a comparatively large angle of inclination, without any risk of the
5 objects 11 moving out of the holders in question.

It will be apparent that variations and/or additions to the above-described method and device are possible within the spirit and scope of the invention. Thus it is e.g. possible to use other means for aligning and fixing the holders 4 with respect to the carriers 2. It is e.g. conceivable to use electro magnets provided on the carriers 2, which cooperate with parts of the holders 4 consisting of a material that can be
10 magnetized. Naturally also other forms of the holders accommodating the objects are conceivable.

Although in the foregoing special attention has been paid to the application in handling luggage in airports or the like, it will be apparent that also other applications will be conceivable.

Claims

- 15 1. A method of handling objects, in particular luggage, by means of an installation provided with and endless conveyor, whereby a supply conveyor for the supply of the objects to the endless conveyor connects to one side of said endless conveyor, whilst a discharge conveyor for the discharge of the objects likewise connects to one side of said endless conveyor, said endless conveyor being provided
20 with carriers, which are tiltable about pivot pins extending at least substantially in the longitudinal direction of the endless conveyor, said carriers functioning to discharge an object carried by a carrier on a discharge conveyor, characterized in that prior to being supplied to the endless conveyor the objects to be handled in the installation are received in holders, that said holders are secured to the carriers, that the holders and the carriers are tilted so as to remove the objects from the holders at the
25 location of a discharge conveyor, and that the empty holders of the carriers are delivered to a further discharge conveyor.
2. An installation for carrying out the method according to claim 1, provided with an endless conveyor with carriers for receiving objects to be moved, characterized in that said carriers are provided with means
30 for securing the holders on the carriers.
3. A device according to claim 2, characterized in that the carriers are provided with pivotable parts, which are pivotable between an open position suitable for supplying a carrier to a holder, and a closed position, by means of which said pivotable parts secure the holders with respect to the carrier.
- 35 4. A holder intended for used with a method casu quo device according to any one of the preceding claims, characterized in that said holder is provided with upright walls and with two bottom parts, which slope downwards from upper edges of confronting walls in a direction toward one another.
- 40 5. A holder according to any one of the preceding claims, characterized in that in the horizontal position of a holder a bottom part extends at an angle of $\pm 30^\circ$ with respect to the horizontal, whilst the other bottom part joins up with the bottom end of the former bottom part at an angle of $\pm 90^\circ$.
- 45 6. A holder according to claim 4 or 5, characterized in that near the lowest point of the space for receiving an object in a holder aligned holes are provided in confronting walls of the holder.

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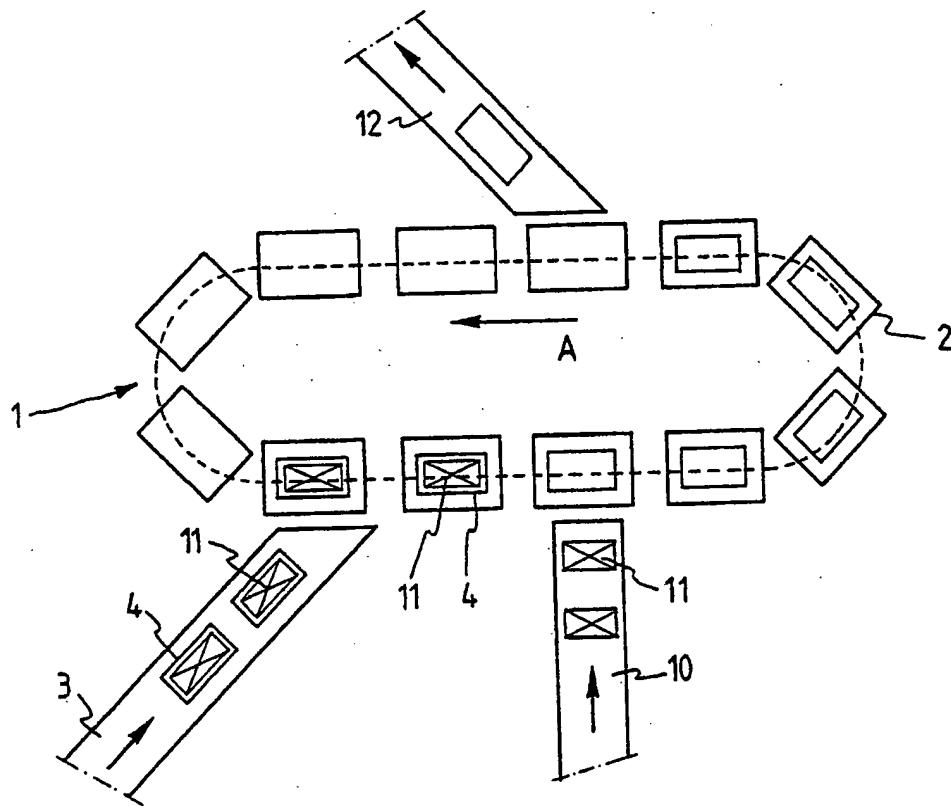


Fig 1

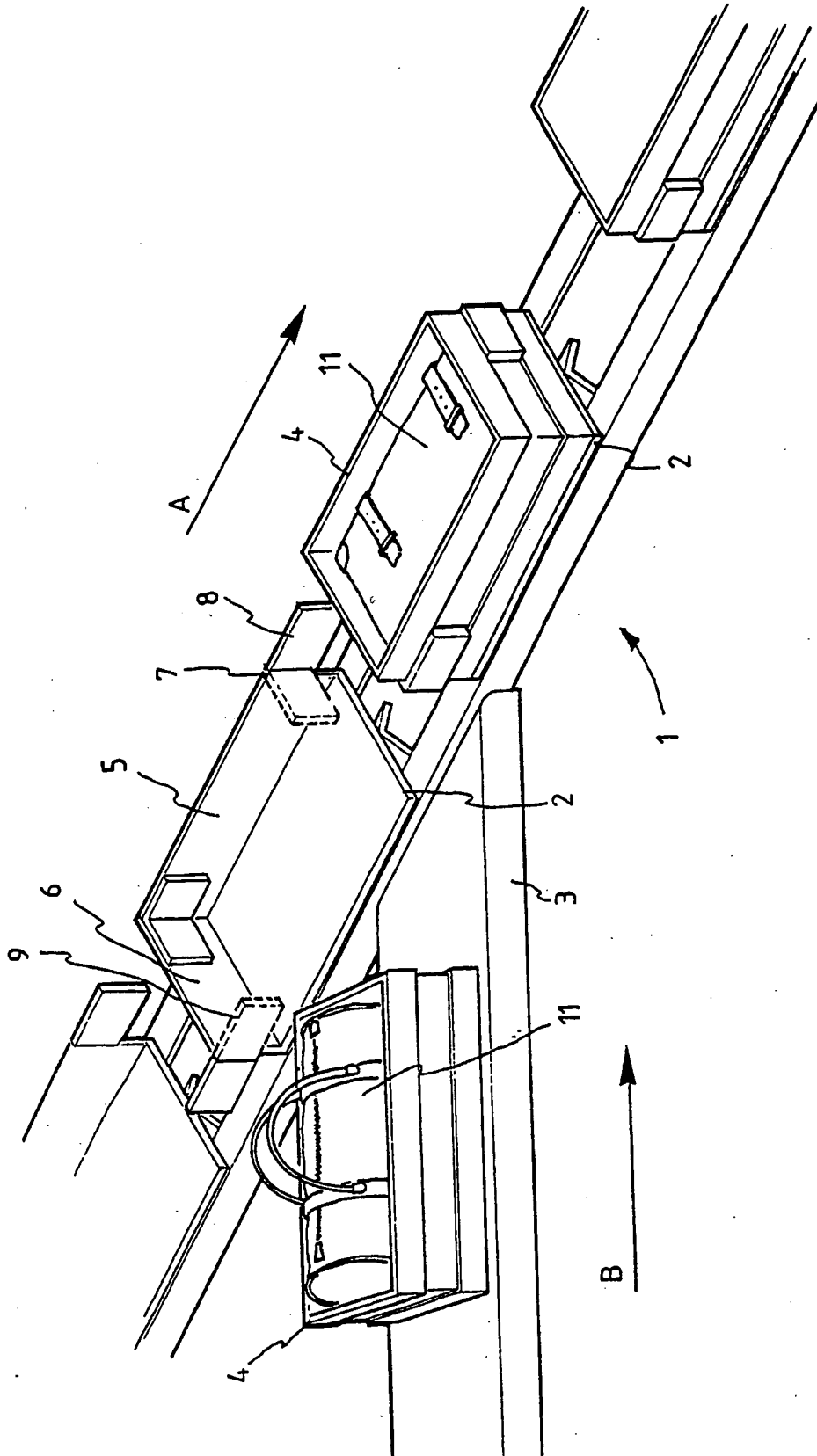


Fig 2

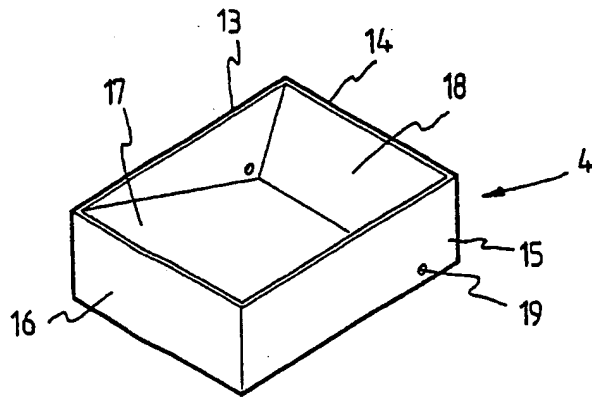


Fig 3

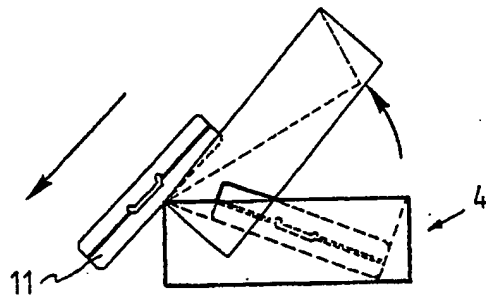


Fig 4

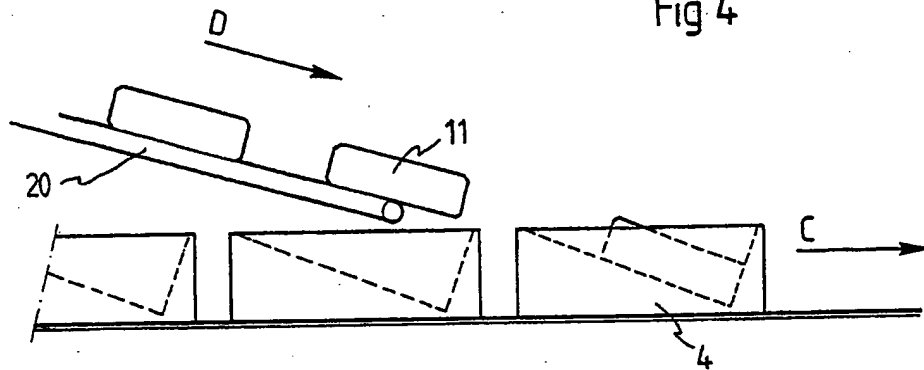


Fig 5

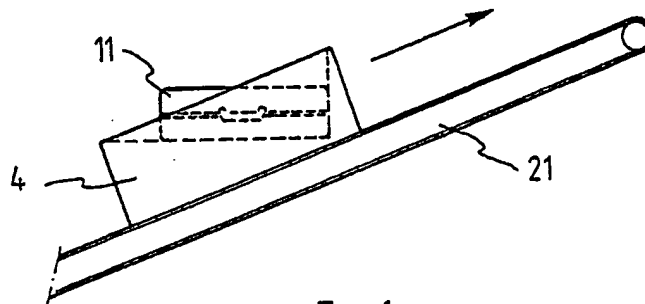


Fig 6